Influence of Media on Children's Attention and Comprehension

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Main Topics

- What we know about attention to TV
- How this understanding informs the creation of successful educational TV
- Bringing issues of attention to the age of new media
- Background media and Multitasking

How is attention linked to effects

- Attention is a prerequisite for learning
  - Necessary but not sufficient
- Most effects of media content are based on children learning from what they see
- What draws children's attention is therefore important to understanding what they will learn.
- The attention and comprehension link

Attention and Comprehension

- For learning to occur, attention is not enough
  - Viewers must also understand
- Relationship between attention and comprehension
  - Attention guides Comprehension
    - We learn what we attend to
  - Comprehension guides attention
    - We attend to what we understand

Attention guides Comprehension

- Formal features of television attract children's attention.
  - Perceptually salient features including rapid action, animation, music attract attention.
  - Learning of content can follow from attention.
- Reactive model
  - Control is from medium not from child
  - More appropriate for younger children
- Visual attention predicts visual comprehension
- Audio attention predicts audio comprehension

Comprehension guides Attention

- Children attend to what they find comprehensible (and do not attend to the incomprehensible).
- Active model
  - Viewer is cognitively involved
  - Attention is determined by the child's goals and agenda
- Normal vs. Nonsense language clips
- Formal Features still play a critical role.
  - Provide experienced viewers with information about content and comprehensibility
- Feature-sampling: children use auditory cues and scene transitions to reevaluate their current viewing decision.
- Evidence that children learn to use features in this way.
  - Kids who watch more Blue's Clues are better at knowing when to look at the screen –Crawley 2002

Integrating these approaches

- The viewing process is one that includes both automated and guided processes
- Formal features can elicit automated orientation
  - Younger viewers' attention is organized around salient formal features.
  - Older viewers "read" features to determine if the content presented will be comprehensible and interesting and don't just respond to salience
  - Decisions about current viewing status are reevaluated based on current goals, formal features, and content.

Traveling Lens Model

- Integrated model of attention and comprehension
- The peak of the curve denotes stimuli that receive maximum attention
- Truly difficult materials become challenging and then interesting.
  - Attentional inertia aids in exposure to difficult content
- Video games perfectly tap into this process by increasing the difficulty of tasks.
- Gee recognizes the teaching potential of video games

Educational Features

- To encourage verbal learning media content should supplement and reinforce the audio track.

- Visual imagery that is separate from the teaching method can interfere with learning.

- Repetition helps learning in TV.

- If content isn't embedded into the narrative, the story is learned but not the educational content

Educational TV

- Educational TV has been successful in part because of the understanding of how children watch and learn from television
- Our understanding of the process of watching TV has led to the creation of very successful educational TV

Educational Content

- Expertly produced educational TV with input from developmentalists can have
  - Short term effects
  - Long term effects

Attention in the age of New Media

- New theories are needed to explain attention to new forms of media

- Some aspects of television theory are useful others are not

- With television the audio track guides attention and young children's attention during play sessions

- Video Games demand 100% eyes on screen
  - Feature-sampling does not work with VG

- Interactivity increases attention (Calvert 2005)

Educational Features of Games

- Do certain features of VG make them inherently better teachers?
- Maybe
  - Traveling lens model
    - Good video games constantly challenge players with more difficult content.
  - Gee recognizes Video Games as excellent teachers.
    - The format transfers easily to educational content.
    - Not limited to young children—older children and adolescents are potential audiences as well.
  - More research is necessary to fully capitalize on the potential of Video Games as teachers.

Educational Features of Games

- Maybe Not
- Level of Interaction
  - Increases attention and interest
  - But does not increase learning either verbal or visual
- Interactive stories with non-central content can distract from learning
  - Storybooks with clickable extras are not as easily learned.

Attention in the age of New Media

- New forms of TV demand new attention to attention

- DVR and attention

- The feature-sampling method is expanded
  - Unignorable features force viewers to be active in deciding their next viewing choice
  - Programs stop and another one must be chosen
  - Silence and onscreen messages indicate the need for this decision.

Video Games May Enhance Attention

- Playing video games has been shown to enhance attentional visual capacity (Green & Bavelier 2003)
  - Children who played an action video game in a lab performed better on a visual attention task following the game.
  - Tetris did not have a similar effect.
  - The game required attention to be distributed and switched around the visual field.
- The tasked enhanced the children's ability to allocate spatial attention over the visual field.
- They concluded that "video-game training enhances task-switching abilities."
  - This training may allow them to excel in multitasking.

Background Media vs Multitasking

- Background Media use
  - Performing a task with media in the background
  - Media is not the primary activity
- Multitasking
  - More than one medium/activity at a time
  - Media can be primary activity
- In terms of effects these are theoretically the same
- Does performing a task alongside media reduce performance of that task?

Theories Supporting Problems of Multitasking/Background Media

- Limited Capacity Model or Capacity Interference
- TV viewers goals and interests guide the level of resources committed to viewing processes (storage, encoding, retrieval).
- Automatic allocation of resources (attention) is evoked through production type.
- Content and structural aspects can increase arousal which results in automatic allocation of resources.
- Too many required resources makes secondary tasks suffer.

Theories Supporting Problems of Multitasking/Background Media

- Structural Interference

- Similar tasks interfere with one another even if overall cognitive resources are not exceeded.

  - Multitasking using different media that are all verbal (reading vs. drama vs. other) may lead to more problems.

Theories Supporting Problems of Multitasking/Background Media

- Attentional Interference
- TV elicits automatic orienting responses
  - Draws attention away from other activities
  - Primarily applicable for younger children
  - Older children/adolescents will be drawn away from other activity when important/ interesting audio features are present

Background Media

- Two main areas of study
  - Very young children and TV
    - children can not comprehend content and are playing or doing something else while TV is on
  - Older children/adolescents and homework
    - TV is understandable

Background TV

- Very young children and Background TV
  - 35% of children 0-6 live in a home where the TV is on "always" or "most of the time" even if no one is watching. (Vandewater et al., 2005).
  - Background TV reduces the length of toy play episodes, results in less play overall and shorter periods of focused attention (Schmidt et al., manuscript).
    - Results were explained by TV eliciting orienting responses, looking at TV displacing play and interfering with individual play sessions.

Background Media

- Older children/adolescents and Background TV
  - 30% of young people talk on the phone, instant message, watch TV, listen to music, or surf the Web for fun "most of the time" they're doing homework.
  - College students who had a TV on when performing a reading task scored worse than no-TV groups (Armstrong, 2000)
  - 8th graders who performed pencil and paper and memorization tasks with the TV on performed worse than those in no-TV groups (Pool, Koolstra, & van der Voort, 2003).

Background Media

- Specific structure of background media may matter.
  - Soap Operas but not music videos
  - Other studies did not find a difference between drama and action
- Music while performing homework has no effect
  - Support for the Structural Interference theory

Multitasking

- Performing multiple tasks (usually multiple media) with no necessary primary task.
- 26% of media use occurs with another media
- Multiple media at once
  - But also multiple tasks on one computer (happens a lot online especially to talk to friends as they do other things)
- Very little research on this topic other than descriptions
- Results from studies of background TV and cognitive theory would predict poorer perfomance.

Multitasking

- It's been argued Multitasking doesn't exist
  - People toggle back and forth between tasks
- But users must monitor other forms to know when to toggle
  - The feature-sampling attention guidance theory of TV viewing provides an outline for how this happens
- At some level attention is being allocated to do more than one thing at a time
- More research is necessary to determine how multitasking affects development of attention and quality of all tasks performed.

Summary

- Theories of attention to television need to be revised and tested in terms of New Media.
  - Success of educational content depends on fully understanding the process through which children learn from and attend to media.
- Demands of attention to video games and differences in attention processes from multitasking may change the way children develop attentional skills.